



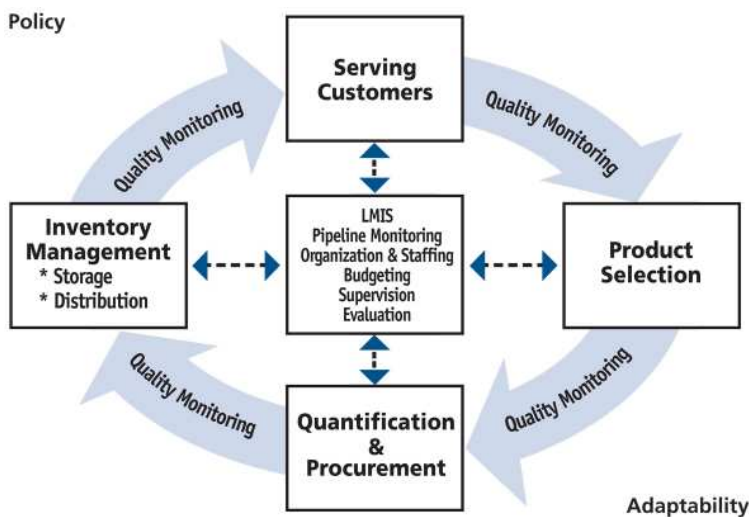
Strategies for Strengthening Laboratory Supply Chains

Importance of Laboratory Services and Supply Chains

Laboratory services play a significant role in a country’s public health system and in the delivery of quality health services. Strong and supportive laboratory services are required for both expanding programs for HIV & AIDS, tuberculosis (TB), and malaria and for assuring overall health. Laboratory capacity depends on the availability of the required commodities to perform these tests, with most tests requiring multiple commodities to be available simultaneously. Well-functioning supply chains will enhance availability of the commodities required to provide the necessary laboratory services.

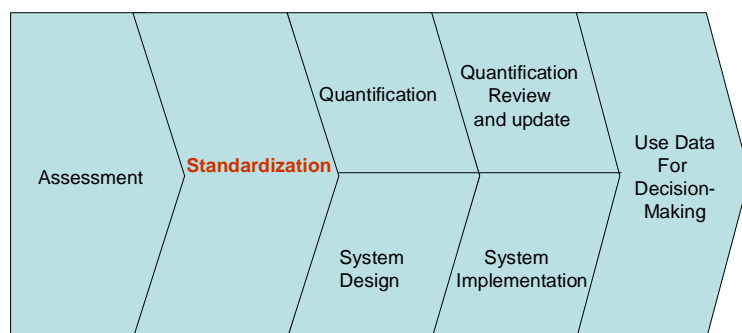
The ultimate goal of any supply chain is to get products to customers. In the case of laboratories, products must get to the laboratory personnel who perform the test for clients. The logistics cycle, shown in figure 1 below represents the series of activities, resources, people, and information needed to move products through the supply chain to the customers.

Figure 1. Logistics Cycle



The diagram represents a continuous cycle where all elements are interconnected, so decisions made at a single point directly impact other parts of the cycle. It is not possible to intervene in one supply chain link without impacting the other supply chain activities, just as it is difficult to intervene in just one area and expect the supply chain to work well. This narrative will focus on three strategies to strengthen laboratory supply chains: laboratory assessment, logistics system design and implementation, and standardization. Figure 2 below graphically represents the sequence of these activities in-country. As the figure shows, laboratory assessments provide the context and identify the need for other interventions (e.g. if laboratory standardization is required). Standardization is a prerequisite for optimizing laboratory supply chains and should precede quantification and system design.

Figure 2. Activities to Strengthen Laboratory Supply Chains



Assessment of Laboratory Systems

The assessment of laboratory systems is an important intervention for strengthening the supply chain because it helps to define the current context and identify and prioritize supply chain interventions within the context of lab management practices. In addition, laboratory assessments can serve as a baseline for evaluation or on-going monitoring and evaluation of the supply chain’s performance.

The USAID | DELIVER PROJECT’s experience has shown that for laboratory commodities it is necessary to evaluate lab management practices, capacity, and services, in addition to the supply chains. This is because laboratories are a service area. Product is not directly dispensed to clients, but rather utilized through the service of testing; therefore, the way laboratories are functioning, including their human resource capacity and equipment functioning, will impact the use of products.

The USAID | DELIVER PROJECT has developed the Assessment Tool for Laboratory Services (ATLAS), which is a comprehensive tool that assesses all aspects of laboratory services. The tool should be customized and adapted for the local context and environment and can be used in combination with other assessment tools. The ATLAS has been used in Nigeria, Malawi, Botswana and Ghana to conduct laboratory assessments.

Standardization of Laboratory Services

Laboratory standardization is the process of setting test menus, techniques, operating procedures and laboratory equipment for each type of test and for every level in the system. Standardization is not a supply chain intervention, but rather a policy intervention with supply chain implications. The process of standardizing menus, techniques, equipment, and operating procedures, helps to rationalize and streamline the total number of commodities. Standardization is therefore a critical prerequisite for two key supply chain activities -- quantification and system design. This is because in non-standardized systems, the total number of commodities can literally run into the thousands thereby making their management difficult. For example, conducting a national quantification for the thousands of commodities required in a non-standardized laboratory system will be extremely challenging if not impossible.

Standardization activities have taken place in a number of countries over the last five years including Kenya (2004), Uganda (2005), Ghana (2007), Ethiopia (2007), Zambia (2007), and Botswana (2009). In January 2008, a consensus meeting was held in Maputo, Mozambique, on laboratory testing standardization and harmonization. This meeting brought greater international attention and consensus on the need for laboratory standardization, which has translated into greater interest at the country-level to undertake this activity.

Steps in Standardization

Since the first laboratory standardization exercise in Kenya in 2004, the methodology and framework has continued to evolve and expand. The methodology includes a series of steps, including to:

1. Assess existing test menus, techniques, standard operating procedures and equipment at facilities from all levels
2. Hold consensus building workshop with stakeholders from all levels
3. Update laboratory policy documents with new standards
4. Determine timeframe for reviewing and updating standards
5. Disseminate and implement standards at all facilities at all levels

The list of steps is exhaustive and comprehensive, and depending at what stage in the process a country might be, it may need to undertake some or all of these steps. Furthermore, some steps can be taken concurrently.

Supply Chain Benefits and Challenges from Standardization

A significant reduction in the number of laboratory supplies managed through national supply chains has been achieved through standardization. For example, in Kenya, the national laboratory inventory was reduced from an estimated 3,000 items to less than 300. The standardization exercises that have been undertaken in a number of countries highlight some key benefits and challenges to the process.

Standardization is a critical early intervention that provides immense benefits across supply chain, management, and quality assurance functions. Aside from the obvious benefits of improving the efficiency and effectiveness of a manageable supply chain by streamlining the number of laboratory products, other supply chain benefits include rational in decision making in product selection, forecasting, quantification and procurement; greater affordability in procurement of commodities through economies of scale; and agility in the supply chain by allowing the redistribution of supplies to reduce stock imbalances. In Zambia, for example, having a greater number of one type of equipment allowed the ministry of health to negotiate maintenance contracts with the purchase of reagents. Given that functional equipment is a major bottleneck to laboratory service delivery, the negotiation of service as a part of the commodity contract is critical to the success of the laboratory program.

By its very nature, standardizing laboratory systems can be a challenging process. Common challenges encountered during the standardization process include rapidly changing technology, difficulty involving and reaching consensus among all stakeholders, allocating time and resources to implement transition plan, changing provider behavior to comply with new standards, and complying with existing long term contracts with suppliers. In Kenya, for example, there were initially significant challenges in reaching consensus on standardizing hematology machines; at the end of the exercise no consensus was reached on standardizing the 6 different systems existed at 16 sites. The failure to reach

consensus had other supply chain implications, including the inability to quantify and procure reagents and consumables for hematology.

Lessons Learned in Standardization

Through these experiences, the USAID | DELIVER PROJECT has identified the following key lessons in standardization:

1. Standardization requires significant time and resources to reach consensus and to implement the new standards.
2. The process undertaken for standardization must be collaborative and include stakeholders from all levels of the system. This is because the most informed standardization decisions can be taken with individuals from all levels of the laboratory system and related programs present, and also to achieve buy-in to the process and selected standards. Conducting the standardization process through the facilitation of a consensus-building workshop is a critical part of this collaborative process.
3. Standardization is a key first step in optimizing and strengthening laboratory supply chains, by streamlining the number of products that must then be managed through the supply chain.

Design and Implementation of Laboratory Logistics Systems

The purpose of a laboratory logistics system is to obtain and move commodities in a timely fashion to the places where they are needed at a reasonable cost. All laboratory assessments conducted by the USAID | DELIVER PROJECT to date have highlighted the need for a standardized logistics system as a priority intervention. In countries where laboratory services are not standardized, the standardization workshop precedes the logistics system design process.

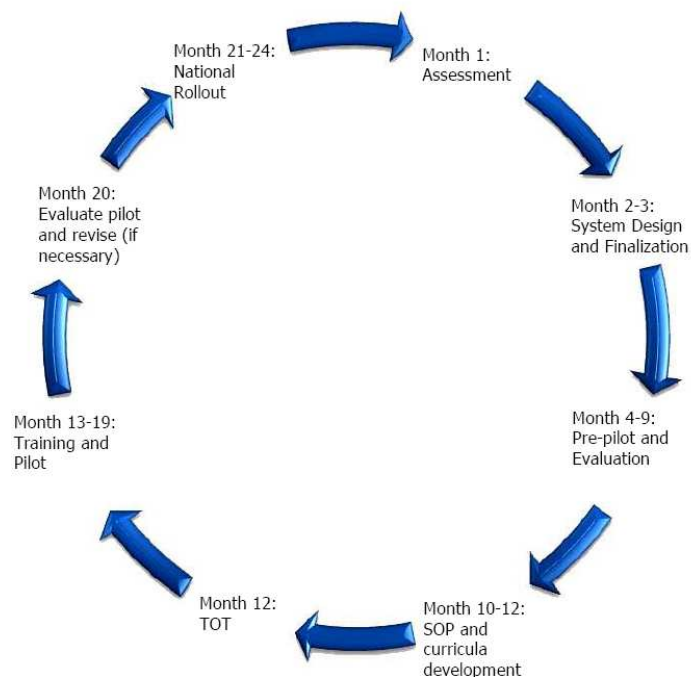
The project recommends that countries design a logistics system through a participatory workshop whereby users of the system design the system and develop local solutions for challenges in supply chain functions. A logistics system should be designed to include the following elements:

- a logistics management information system capable of collecting and reporting timely logistics data to enable quantification, procurement, storage, and distribution,
- an inventory control system that ensures proper management of stock levels,
- storage and warehousing facilities,
- a distribution system for efficient movement of commodities from manufacturers through to facilities, and
- sufficient personnel trained in logistics at health facilities with adequate supervision and support from the central level.

Every commodity has unique considerations that must be considered during the design of the logistics system, and laboratory commodities are no exception. For example, laboratory commodities can be very bulky, and this is a particular challenge in resource-limited settings because storage and distribution space is at a premium. These considerations can and should be addressed during the design process; for example, designers might choose an inventory control system that requires lower stock levels and add additional trucks to the distribution plan to accommodate the additional space required for the transportation of bulky items.

However, designing a logistics system is only the beginning of a range of activities. Developing a logistics system is a dynamic process that requires ongoing training, monitoring, evaluation, and adjustments to ensure the system is effective and efficient. In one country that is implementing a logistics system for laboratory commodities, the entire process from design to national rollout is scheduled to take 24 months, as illustrated in figure 3 below.

Figure 3. Laboratory Logistics System Design/Implementation Process in One Country



While the timeframe for the design and implementation of a laboratory logistics system can range from approximately 12 to 24 months, there are key steps in the process, including the approval of the system, the development of training materials, and the training of staff. Experience has shown, and the timeline above reflects that certain steps in the process can be time consuming; for example, getting approval from stakeholders on the final system design and the standard operating procedures can be particularly time-intensive. In addition, because logistics systems are a relatively new concept for laboratory personnel, piloting the design prototype first in selected regions before rolling it out nationally has proven an effective strategy to get buy-in and build confidence in the new system. However, the piloting strategy also translates into additional time in the implementation process.

Conclusions

Strengthening laboratory supply chains requires a variety of interventions that address the series of logistics activities that are required to get products to the customers who require them. In addition to the interventions addressed in this paper, a variety of other interventions may be necessary to support other links in the supply chain.

Additional References

Diallo, Abdourahmane, Lea Teclemariam, Barbara Felling, Erika Ronnow, Carolyn Hart, Wendy Nicodemus, and Lisa Hare. 2006. *Assessment Tool for Laboratory Services (ATLAS) 2006*. Arlington, Va.: DELIVER, for the U.S. Agency for International Development.

USAID | DELIVER PROJECT, Task Order 1. 2008. *Guidelines for Managing the Laboratory Supply Chain: Version 2*. Arlington, Va.: USAID | DELIVER PROJECT, Task Order 1

USAID | DELIVER PROJECT, Task Order 1. 2008. *Building a Standard Laboratory Equipment List*. Arlington, Va.: USAID | DELIVER PROJECT, Task Order 1.

USAID | DELIVER PROJECT, Task Order 1. 2008. *The Supply Chain Implications for Standardizing Laboratory Supplies: Lessons Learned and Practical Approaches*. Arlington, Va.

USAID | DELIVER PROJECT, Task Order 1. 2008. *Designing Logistics Systems for Health Commodities*. Arlington, Va.: USAID | DELIVER PROJECT, Task Order 1.